

Good morning Madam Chair, members of the State and Central Valley Regional Boards. My name is Les Grober, Senior Land and Water Use Scientist in the Central Valley Board's Sacramento Office. This presentation will provide an overview of salinity issues in the Central Valley.

The State and Regional Board's have had, and will continue to have, a number of issues before them where salinity is a major consideration:

- SJR Salt and Boron TMDL.
- Delta salinity standards, as part of the periodic review.
- The need for salinity objectives in the San Joaquin River upstream of Vernalis.
- Salt discharges from point sources such as wastewater treatment plants, food processing operations, and confined animal facilities.
- Also agriculture's attempts to deal with salt impacted lands.

Frequently there have been questions on how any one of these specific issue relates to another. One purpose of this presentation is to provide an overview of present policies to better understand their relationship with these issues.

Before I provide the overview, it is important to understand what salt is. Virtually all water contains some salt. Salts are minerals picked up from rocks and soils as water moves through or over the ground. This is a natural process. Eventually all this salt ends up in the ocean or in some cases in an inland seas or a salt sink.

We however have disrupted that process as we divert water for various uses. As humans, plants and animals use water, the salt is left behind. Thus the salts are more concentrated in a smaller volume of water. The question is how to deal with that salt.

Slide 2



First I will describe the three hydrologic basins within the Central Valley.

Slide 3



Two of our basins, the Sacramento and San Joaquin River Basins, are covered under one Water Quality Control Plan as both have a natural outlet to the ocean through the Sacramento-San Joaquin Delta Estuary and San Francisco Bay (Bay-Delta). Water development however, has changed the rate and routing of flow and salt from these basins.

In contrast, the third basin in the Central Valley, the Tulare Lake Basin, no longer has a natural outlet to the ocean and all the salt remains within the basin. Because of this, it is covered under a separate Water Quality Control Plan.

Finally, because of the importance of the Sacramento-San Joaquin Delta Estuary to the natural environment and economy of California, the Bay-Delta is governed by its own Water Quality Control Plan. The Bay-Delta provides drinking water to two-thirds of the State's population and water supply for agricultural areas both in the Delta and beyond.

Slide 4



I will now review with you the Regional Board's Central Valley salinity control policies for the Sacramento, San Joaquin River, and Tulare Lake Basins. Though each basin is different, they are interconnected; and each has dramatically different salinity protection needs.

The policies in the Basin Plans were developed 35 years ago. Although initially prepared to meet the needs of the wastewater treatment plant grant program, these Basin Plans also included policies regarding other water quality issues, one of which was salinity. It is because the salinity issue was so large in the Southern San Joaquin Valley, that the State Board authorized the preparation of two water quality control plans for the Central Valley.

Though I think the policies in the Basin Plans are still valid, we must remember that these policies were developed 35 years ago; we may need to re-look at some. The issues are complex; I will therefore give you an overview, not a detailed discussion.

**Tulare Lake Basin
(Salt Control Basinwide)**

- Controlled degradation policy
- Highest quality import supplies
- Maximum export of agricultural salt via Valley-wide drain
- Promote export of all salt sources

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Let's start with the most salt affected basin, the Tulare Lake Basin or the Lower San Joaquin Valley. Here the focus is on groundwater.

The initial Basin Plan, prepared in 1975, looked intensively at groundwater salinity. The conclusion was that salt buildup in the groundwater of the Tulare Lake Basin would eventually eliminate many, if not all, of its beneficial uses. This conclusion forms the basis for the Board's present salt control policies. The Board's policy for groundwater reflects both long and short term needs:

The Tulare Lake Basin is effectively a closed hydrologic basin with no outlet to the ocean; salt, both local and imported, is thus being re-circulated and is accumulating due to water use. The Basin Plan policies strive to control the rate of groundwater degradation. The goal set out in the Basin plan is to extend the usable life of the groundwater aquifer for the longest term possible. The Plan is consistent with State Board Decision 68-16 (anti-degradation) as it was in the best interest of the people of the State at that time. How is this done?

- The Board's policy promotes the importation of the highest quality supply water for the basin and protection of in-basin surface water supplies as these represent the largest contribution to the basin's overall groundwater degradation.
- The Board's policy also promotes any efforts to export salt from the Tulare Lake Basin. With irrigated agriculture being the largest contributor of salt in the basin, the initial Board policy was to support the development of a valley-wide drain to carry agricultural salts out of the Central Valley.
- The Board later recognized that more than just agricultural salts must be managed and expanded the policy to support the construction of a valley-wide facility to remove all salt-laden wastewater from the Basin regardless of its source.

**Tulare Lake Basin
(Managing Remaining Salt)**

- Promote water reuse
- Movement of salt westward
- Isolate salt in evaporation basins (interim solution)
- Focus regulation on most concentrated sources

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The Board realized that it must take interim steps to manage salt buildup until a long-term solution is in place. These interim steps formed the second cornerstone of the Board's salinity control policy in the Tulare Lake Basin – to focus on waste discharges.

It encourages dischargers to control and manage salts that remain in the Basin. The goal is to not create pockets of accelerated degradation.

1. The Board's policy promotes reuse to reduce the need to import salt and to minimize the final waste stream that may need export.
2. The Board's policy promotes application or disposal of treated wastewater towards the trough of the valley where the potential to collect the unusable salts is highest. The reason for this policy is that capturing salt once it starts to move to groundwater is impossible unless there is a high (perched) water table— such a perched water table is only present in the trough of the valley in the Tulare Lake Basin.
3. The Board's policy also stresses that capturing and isolating salt in evaporation basins is an acceptable interim solution but is not considered a permanent solution. This is a very controversial policy. The USBR is looking at evaporation basins as a means of solving the problem of salts from salt-affected lands on the Westside of the Valley. Staff commented on this proposal that the Board has a long-held position that out-of-valley disposal is the only sustainable solution to salt build-up.

I think it would be helpful to take a look at why the Board has so steadfastly held to that position even when receiving severe criticism from several sectors, both in-valley and from outside. The reasons are that:

- Wildlife impacts from these facilities are difficult to mitigate and avoid;

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- There are no known long-term groundwater protection mechanisms that are affordable;
- We still have not found a method for dealing with the long-term handling and disposal of thousands of tons of salt which could be placed in these sites; and
- The three issues of wildlife impacts, groundwater protection, and salt buildup and disposal will make these sites appear like toxic landfills and no one is going to want them near urban, wildlife, water supply, or other areas. Thus we may be faced with having many hundreds of sites in remote locations as agriculture, cities, industries and others try to deal with salt. If these are focused in remote areas, we cannot ignore the strong point of environmental justice for the rural areas. Because of the unknowns and the potential that these sites could be a legacy for our children and grandchildren for years to come, the Central Valley Board continues to consider them to be interim solutions until an out-of-valley option is developed.

4. Following Board direction staff has focused regulation on the most concentrated salt sources: Oilfield Brines; Olive Brines; Agricultural Evaporation Ponds; Wineries And Food Processing; Wastewater Treatment Plants; Confined Animal Facilities.

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San Joaquin River (Causes of Salinity)

- Urban and agricultural development
- No dilution flows
- High quality supplies exported
- Lower quality imported supplies
- Poor quality agricultural return flows

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Let's move on to the San Joaquin River Basin, which is no less salt affected, but here the focus is on surface water protection especially in the San Joaquin River.

The causes of this salinity problem are multi-faceted. This includes increased urban and agricultural development in the basin, over-allocation of surface water supplies in the basin (no dilution flows), diversion of high quality flows to outside the basin, higher salinity water being imported into the basin, and salty return flows from agriculture and other sources.

**San Joaquin River Basin
(Salinity Control Policy)**

- Valley-wide drain
- Use of BMPs
- Use San Joaquin River if water quality objectives met

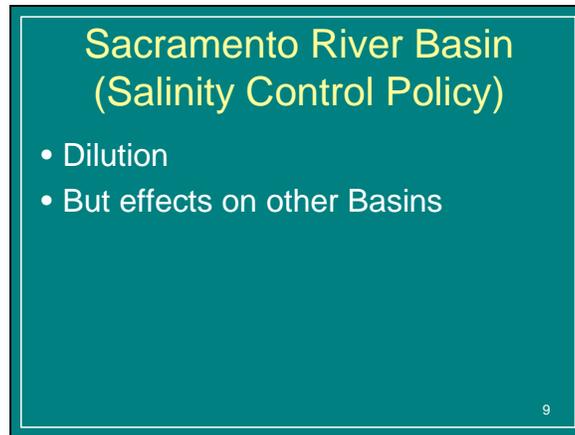
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The cornerstone of the Board's salinity control policy in the San Joaquin River is to promote the maximum export of salt from the Basin. To accomplish this:

1. The Board continues to promote the development of a valley-wide drain to carry agricultural salts out of the Basin.
2. The Board promotes the use of BMPs, including water conservation and reuse to minimize the total salt load needing to be exported from the Basin.
3. The Board allows the San Joaquin River to be used to remove salts from the Basin so long as water quality objectives are met.

This latter policy has led to the need for the Board to adopt a TMDL for salt and boron control in the San Joaquin River. In essence, with the lack of a valley-wide drain, we are forced to use the San Joaquin River as the salt export mechanism. This is not without consequences:

1. The lack of dilution flows in the River will limit the total load of salt that can be safely removed from the basin, thus potentially building up salt similar to the Tulare Lake Basin.
2. The rapidly expanding urban population and industrial development in the basin will increase the need for salt removal.
3. The salt that is being exported through the San Joaquin River, at this time, is being recirculated into the federal and State water project pumps and returned to the water users in the San Joaquin River Basin as well as to water users in the Tulare Lake Basin, which we have just discussed, and to the Southern California basins that are also facing a similar salt crisis.
4. Without a salt export mechanism, salinity IS building up in the groundwater on both the east and west sides of the river. As these salts move uncontrolled into the River, the ability of the river to carry salt from the basin will be further limited.



Sacramento River Basin
(Salinity Control Policy)

- Dilution
- But effects on other Basins

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Let's move on to the Sacramento River Basin where salt buildup and salinity control have rarely been an issue. The Board has focused on point source discharges to be sure that local salinity hotspots do not develop. By hotspots I mean localized areas of elevated salinity that impairs beneficial uses. The primary method used has been dilution. This approach however is not without consequences.

Changes in salinity of the Sacramento River impact many water users but most of those are outside the Sacramento River Basin. For example, a 1 mg/L change in salinity of the Sacramento River results in 5,000 tons of salt being exported by the federal and State Water Projects to the San Joaquin River and Tulare Lake, Central Coast, and Southern California Basins. So what we don't do here impacts other areas.

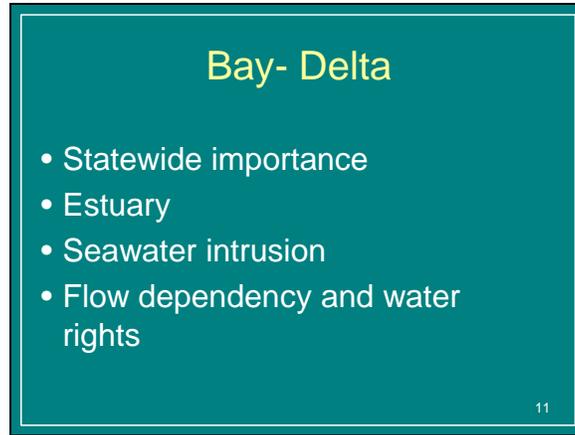
Point Sources

- Protect local water quality
- Effect on other areas not considered
- Control options are source control or treatment

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Region-wide, the focus of regulation for point sources has been to protect local surface and groundwater. Site-specific permit terms are established that depend on ambient water quality and presence of dilution flows. The incremental addition of salt and its effect on other areas has not generally been considered.

In the absence of dilution, control of salt is limited to source control, treatment, storage, and disposal.



Bay- Delta

- Statewide importance
- Estuary
- Seawater intrusion
- Flow dependency and water rights

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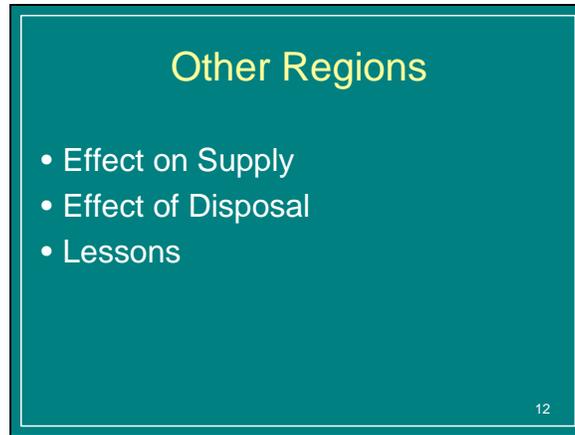
Now a few words about the Bay-Delta...

The primary reason for a separate Water Quality Control Plan for the Bay-Delta is, as I mentioned earlier, its statewide importance and effect on multiple Regions.

Unlike the other basins, The Delta is an estuarine environment. In addition to the salinity concerns shared with the Sacramento and San Joaquin, the Delta is affected by seawater intrusion that can adversely affect habitat, and water supplies for municipal supply and agriculture.

In the Delta, the mix and timing of salinity impacts are highly influenced by flow. Because of this flow dependency, the on-going responsibility for the Bay-Delta plan resides with the Division of Water Rights. The plan has been implemented, in large part, through water rights decisions. The plan, however, also provides direction to the Central Valley Regional Board to implement various water quality controls including salinity controls.

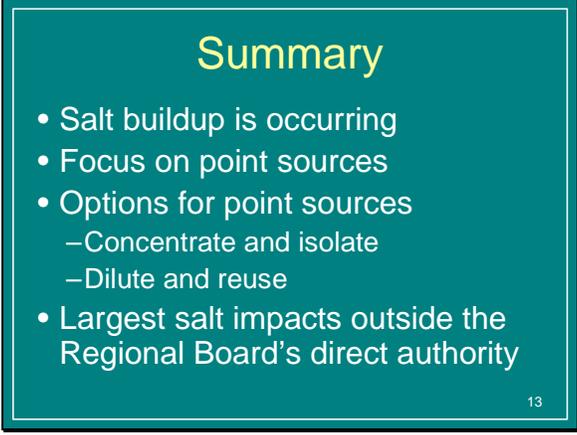
Because of the close relationship between SJR and Delta water quality, there has been coordination between Region 5 and the Division of Water Rights on the development of control programs.



As I alluded to earlier, what happens in the Central Valley can have a large impact on other Regions- 2,3,4,8,9 (San Francisco Bay, Central Coast, Los Angeles, Santa Anna, San Diego). Changes in Delta water quality directly affect water supply of agriculture, food processors, and Publicly Owned Treatment Works (POTWs). This makes it more difficult for these entities to comply with permit conditions in those regions.

As we pursue disposal options, there will be a need to coordinate with Regions 2 and/or 3. Because of vested interest in maintaining and improving supply, there is a vested interest in disposal so long as all water quality and environmental concerns are addressed.

Finally, there are lessons to learn. The Santa Ana Region has successful salinity control and brine disposal in their Region. That can be a model for what is needed here. But the scale and complexity here are far greater with a much larger area and more institutional barriers.



Summary

- Salt buildup is occurring
- Focus on point sources
- Options for point sources
 - Concentrate and isolate
 - Dilute and reuse
- Largest salt impacts outside the Regional Board's direct authority

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In summary, I think there are several overriding themes:

- Salt buildup is occurring, especially in the Tulare Lake and San Joaquin River Basins.
- Although the Board promotes salt export, there is no systematic outlet for salt from the Valley like they have in Southern California.
- In the interim, we are trying to prevent hotspots by using regulatory controls on point sources.
- With no salt outlet, point source control really only involves two alternatives: isolate the salt and store it in the basin, or dilute it for reuse. Both have long-term consequences.
- Controlling the point source dischargers alone will prevent isolated points of salt buildup, but will not solve the basin-wide salt issue.

We need to bring others into the picture, as the largest salt impacts come from activities that are outside the Regional Board's direct regulatory authority.

Salt Sources Outside the Regional Board's Direct Authority

- Imported water supply
- Salt export discharge points
- Loss of dilution flows
- Groundwater pumping
- Overdraft

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The largest source of salt and greatest long-term threat to salinity buildup in groundwater is the quality of the supply water, which is controlled by the Bureau of Reclamation, the Department of Water Resources, and numerous local water agencies.

We know that salt export from the valley must occur, but the points for export are regulated by other Regional Boards.

Water diversions and water export from the valley takes the high quality dilution flows, and therefore limits our ability to manage salt within the valley. These diversions and water export are water right decisions regulated by the State Board or other water agencies.

Groundwater pumping, conjunctive use, or overdraft could encourage movement of poorer quality groundwater supplies into higher quality areas, yet groundwater pumping is not controlled by anyone.

The Future

- Is our approach effective ?
- How will the valley look in 30 years ?
- Can we export salt ?
- Role of water diverters and importers ?
- Is our approach with point sources effective ?

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Let me conclude by posing a few questions to the Boards and other entities:

Is our approach effective? Our policies were developed over thirty years ago. The valley looks and acts significantly different than it did 30 years ago. We never developed the monitoring network that was envisioned 30 years ago to document basin-wide changes. We need to begin some type of basin-wide assessment.

If we continue with our present policies, what will the valley look like in 30 years? The question is whether we can afford to wait another 30 years before we take a look. We need to begin to develop the resources for an updated assessment of salinity levels in the valley, and how we continue to maintain the ground and surface water beneficial uses.

Can we do salt export? The decisions for this are outside the Central Valley Regional Board's authority. The State Board needs to play a key role in helping to make this assessment and put the mechanisms in place, where needed, to make it happen. Coordination with other Regional Boards is critical. There needs to be a consistent message on long-term salt management.

What, if anything, is the role of those who divert water from the basin and decrease our ability to dilute or manage salt? How do we limit salt that is imported into the basin with water supplies? Do we need to take a closer look at the relationship between water quality and water rights? Do both the State Board and the Central Valley Regional Board need to do more to protect ground and surface water resources in the Valley?

Is our approach with point source dischargers effective? We have just begun to look at salinity control at our land disposal sites. It will take a few years to see if we are effective in mitigating many of the existing problems. The overriding question still remains whether the two alternatives available: 1) dilution or 2) source control, isolation, and storage; are long-term effective policies or whether salt export, will be needed to maintain the viability of these industries.

This brings us to the most important part of this discussion. How are other entities affected by our salt control policies, and what do they offer as recommended changes or improvements. Perhaps more importantly, what do they offer as solutions?

With that I can answer any questions that you may have at this time.